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2001

EPA Superfund
Record of Decision Amendment:

CENTRE COUNTY KEPONE
EPA ID: PAD000436261
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STATE COLLEGE BOROUGH, PA
03/08/2001

APPENDIX D

AMENDMENT NO. 1
TO THE RECORD OF DECISION
AT THE
CENTRE COUNTY KEPONE SUPERFUND SITE
OPERABLE UNIT #1

STATE COLLEGE, CENTRE COUNTY, PENNSYLVANIA

CENTRE COUNTY KEPONE SITE
OPERABLE UNIT #1

AMENDMENT NO. 1
TO THE RECORD OF DECISION

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AMENDMENT NO. 1 TO THE RECORD OF DECISION

OPERABLE UNIT ONE

CENTRE COUNTY KEPONE SUPERFUND SITE

I. INTRODUCTION

Site Name: Centre County Kepone Superfund Site

Site Location: State College, Centre County, Pennsylvania

Lead Agency: U.S. Environmental Protection Agency, Region ("EPA" or "the Agency")

Support Agency: Pennsylvania Department of Environmental Protection ("PADEP")

A Record of Decision ("ROD") for the Centre County Kepone Superfund Site ("Site") for Operable Unit One ("OU1") was issued on April 21, 1995. This Amendment No. 1 to the ROD ("Amendment") is issued in accordance with Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act, as amended by the Superfund Amendments and Reauthorization Act of 1986 ("CERCLA"), 42 U.S.C. § 9617(c), and 40 C.F.R. § 300.435(c)(2)(i). This Amendment has been prepared to document the nature of the change made to the selected remedy identified in the ROD for OU1; to summarize the information that led to the making of the change; and to affirm that the revised remedy complies with the statutory requirements of CERCLA § 121, 42 U.S.C. § 9621. The Amendment fundamentally alters the remedy selected in the ROD for OU1 with respect to scope, performance, and cost. This Amendment is incorporated into the Administrative Record for the Site.

New information became available following issuance of the ROD for OU1 which gave rise to the need for an amendment. Specific information acquired after the issuance of the ROD includes: a Soil Vapor Extraction ("SVE") Performance Test Report, November 1997; a Pre-Design Investigation Report, January 1998; a Final Focused Feasibility Study Report, February 1999, a Final (100%) Design Report, June 1999, and documentation requesting changes to the ROD, July 1999.

This Amendment modifies the cleanup by reducing the scope for excavation of contaminated on-site soils and requiring that the majority of contaminated on-site soils be remediated in-situ via Enhanced Soil Vapor Extraction ("SVE"). Excavation will still occur where mirex and kepone exceed the clean-up criteria and where bedrock is near the surface (less than 6 feet). The cleanup standards for soil will be modified to correspond with the Commonwealth of Pennsylvania's Act II standards, where applicable. Enhancements to the SVE system will include the use of hydraulic fracturing, multi-phase extraction, and the

placement of a low permeability pavement cap. The regenerative thermal oxidizer ("RTO") installed as part of the groundwater remedy, will treat the volatile organic compounds ("VOCs") that are extracted. The areas where SVE will be implemented includes the Tank Farm/Building #1 Area, the Former Drum Staging Area, and the Designated Outdoor Storage Area. Shutdown and related performance criteria for the SVE system will be established during the Remedial Design. All contaminated soils from these areas are located within the capture zone of the ground water extraction and treatment system.

This Amendment also eliminates the use of the EPA Region III's Risk Based Concentration (RBC) of 160 ppb for kepone for the disposition of excavated soil. The ROD utilized the RBC as a cut off point for the purposes of classifying Site soils as a RCRA listed waste (U142). EPA believes the elevated kepone concentrations found at the Site a result of wastewater runoff and not from the direct result of a commercial chemical product spill. Soils contaminated by wastewater runoff are not classified as a RCRA U-listed waste.

This Amendment modifies the cleanup standard for groundwater in the area of attainment from "background" levels to the Maximum Contaminant Levels ("MCLs") or the non-zero MCLGs listed in the ROD. The contaminated groundwater plume will be pumped and treated until MCLs or non-zero MCLGs for the contaminants of concern are achieved in the area of attainment. For those contaminants of concern that do not have a MCL or MCLG, a risk-based concentration for groundwater corresponding to Hazard Quotient of 1 or a 1 $x10^{-6}$ increased cancer risk, whichever is lower, or shall be used. In addition, groundwater that discharges as Thornton Spring surface water shall be subject to the Pennsylvania Water Quality Standards for aquatic life.

This Amendment also eliminates the requirement for a twenty percent (20%) reduction each year and the NPDES discharge regulations for contaminants present in Thornton Spring surface water as part of the groundwater performance standards. The requirements to comply with the Pennsylvania Water Quality Standards for aquatic life will still apply at Thornton Spring. While this requirement does not include standards for the pesticides mirex and kepone, a site-specific risk-based surface water concentration will be developed for protection of aquatic life at Thornton Spring for these two contaminants. A specific time period for compliance will not be specified, but progress will be assessed at the 5-year review required under CERCLA.

The Amendment will also clarify the requirement for the Spring Creek thermal regime. The requirement for maintaining the background thermal regime during operation of the groundwater pump and treatment system will remain. However, new guidance for temperature criteria has been developed since the ROD was signed. The design and remedial action will utilize guidance from the PADEP document Implementation Guidance for Temperature Criteria (March 1995 and October 1997).

II. SUMMARY OF THE SITE HISTORY AND SELECTED REMEDY

The Centre County Kepone Site consists of an approximate 32.3 acre property housing the RÜTGERS Organics Corporation ("ROC"), an active chemical manufacturing plant, and a portion of the Spring Creek watershed. ROC is located in College Township, Centre County, Pennsylvania. The Site is situated on Struble Road off of Pennsylvania State Highway 26 approximately 2¼ miles northeast of the Borough of State College and 800 feet south of the intersection of Pennsylvania State Highways 26 and 150.

From 1958 through 1977, the plant on this Site was owned and operated by Nease Chemical Company, Inc. (Nease Chemical or Nease). As of December 30, 1977, Nease Chemical Company, Inc., including the Site, was acquired by, and merged with, Ruetgers Chemicals, Inc. The company resulting from the merger was Ruetgers-Nease Chemical Company, Inc. (Ruetgers-Nease). As a result of the acquisition in December 1977, ROC has operated the plant since then.

Since the beginning of operations at the plant in 1958, a variety of organic chemicals have been produced, many with specialized applications, including products and intermediates utilized in the soap and detergent industry, in the manufacture of pharmaceutical products, in the agricultural chemical industry, in metal plating, and in the manufacture of plastics. The primary organic raw materials used in the production of intermediates and products include, but are not limited to, benzene, methanol, perchloroethylene, tetrachloroethane, toluene, and xylene.

Two organic compounds of particular interest which were manufactured as custom products at the plant are kepone (chlordecone) and mirex (dodecachloropentacylodecane). Kepone was produced at two different time periods between 1959 and 1963. Mirex was manufactured at the plant from 1973 through 1974.

In the early 1960s, inspections were conducted by the Pennsylvania Department of Health and initial corrective actions were performed by Nease. Several investigations of the Site geology were conducted by the Pennsylvania Department of Environmental Protection ("PADEP", at that time known as the Pennsylvania Department of Environmental Resources) in the late 1960s. As a result, several recommendations were generated by PADEP which were implemented by Nease.

In the 1970s, PADEP ordered Nease to perform in-situ treatment of wastewater and sludge in the concrete and earthen lagoons using a process called Chemfix. Later that decade, PADEP issued an Administrative Order for Nease to assess the potential environmental impacts at the Site and to abate discharges of industrial wastes.

Numerous subsequent investigations were carried out at the Site from the mid-1970's through the 1980's by various State and Federal agencies, Nease, and Ruetgers-Nease. Based

on the findings of the investigations, PADEP issued a Supplemental Order to Ruetgers-Nease in June 1981. The Supplemental Order required Ruetgers-Nease to remove and dispose of contaminated soil and solid waste material from the chemfixed lagoons and the former drum storage area, to restore the groundwater contaminated with organic chemicals and solvents and to conduct extensive groundwater monitoring to determine the effectiveness of the cleanup and the presence of any other contaminants.

In August 1981, Ruetgers-Nease submitted a plan for groundwater rehabilitation to PADEP followed by an application for approval to construct and operate a groundwater treatment facility. PADEP granted approval for the construction of the groundwater treatment facility in April 1982. Ruetgers-Nease initiated construction in October 1982, and commenced operations in November 1982.

In June 1982, Ruetgers-Nease submitted an engineering plan to PADEP for removal of Chemfix material. Excavation and removal of the Chemfix material was initiated in October 1982. In July 1983, Ruetgers-Nease submitted a closure proposal for the former Chemfix lagoons, which was approved by PADEP in September and by EPA in October of 1983.

The Site was listed on the National Priority List ("NPL") in 1983. In 1985, PADEP issued a notice letter to Ruetgers-Nease to conduct a Remedial Investigation/Feasibility Study ("RI/FS"). The following year oversight of cleanup activities was transferred from the PADEP to EPA.

EPA conditionally approved the RI and FS Reports in March 1993 and September 1994, respectively. A ROD for Operable Unit One ("OU1") was issued on April 21, 1995 addressing the contaminated groundwater, surface water, soils, and sediments, source control measures for surface water discharges and additional soil/sediment sampling of the 15-acre Former Spray Field Area and the riparian areas of Spring Creek. A complete description of the selected remedy as well as EPA's rationale for the decision is presented in the ROD for OU1. The major components of the selected remedy were:

- Extraction and treatment of contaminated groundwater with discharge to the freshwater drainage ditch;
- Long-term groundwater monitoring;
- Excavation and offsite disposal of contaminated soils;
- Surficial Soil Sampling of the 15-acre Former Spray Field Area and the calculation of environmental risks;
- Improvements to the surface water drainage system in the plant production area;

- Engineering controls and hazardous materials management practices for surface water drainage;
- Monitoring of surface water discharge from the Site;
- Excavation and offsite disposal of contaminated sediments;
- Fish tissue and stream channel monitoring;
- Onsite and offsite fencing;
- Deed restrictions; and,
- Riparian-area Sampling, including the drainage channel of Thornton Spring, Section B of the freshwater drainage ditch, and downstream of Benner Fish Hatchery, and calculation of environmental risks.

The ROD for OU1 provided a listing of the Maximum Contaminant Levels ("MCLs") and Maximum Contaminant Level Goals ("MCLGs") for the contaminants of concern in groundwater. The MCLs and MCLGs for these contaminants of concern are listed in Table 1 of this document.

The ROD for OU1 also defined contaminated soils as those exceeding levels that are protective of groundwater for certain organic compounds of concern, as shown in Table 2 of this document. According to the ROD for OU1, contaminated soils from the more isolated and unobstructed areas on the ROC property (the Former Drum Staging Area, the Designated Outdoor Storage Area, and the Tank Farm/Building #1 Area) would be excavated until the soil left in place meets the soil clean-up levels that area protective of groundwater, and disposed of off-site.

TABLE 1
GROUNDWATER MCLs and MCLGs
for the CENTRE COUNTY KEPONE SITE

Contaminant of Concern	MCL (µg/l)	MCLG (µg/l)
Benzene	5	0
Chloroform	100	0
1,2-Dichlorobenzene	600	600
1,1-Dichloroethane	810	-
1,2-Dichloroethane	5	0
1,1-Dichloroethene	7	7
1,2-Dichloroethene	70	70
1,2-Dichloropropane	5	0
Ethylbenzene	700	700
Tetrachloroethene	5	0
Toluene	1,000	1,000
1,1,1-Trichloroethane	200	200
1,1,2-Trichloroethane	5	3
Tricholorehtene	5	0
Vinyl Chloride	2	0
Xylenes	10,000	10,000

TABLE 2
SOIL CLEAN-UP LEVELS
for the CENTRE COUNTY KEPONE SITE

	Chemical	Allowable Concentrations in Soils [(1)] (mg/kg)
1.	Acetone	.463
2.	Benzene	.025
3.	2-Butanone	.473
4.	Carbon Disulfide	13.003
5.	Chlorobenzene	1.984
6.	Chloroform	.264
7.	1,2-Dichloroethene	.210
8.	1,2-Dichloropropane	.015
9.	Ethylbenzene	46.287
10.	Kepone	72.737
11.	Methylene Chloride	.200 [(2)]
12.	Mirex	33.062
13.	1,1,2,2-Tetrachloroethane	.014
14.	Tetrachloroethene	.109
15.	Tetrahydrofuran	.070 [(2)]
16.	Toluene	15.028
17.	1,1,2-Trichloroethane	.017
18.	Trichloroethene	.038
19.	Vinyl Chloride	.001
20.	Xylenes	161.104

Notes:
[(1)] - Summers Model Calculations for subsurface soils with f_{oc} = 4% and natural soil cover as contained in the Feasibility Study dated October 1993.
[(2)] - Level 2 protection standards taken from "PA Guidance for Cleanup Standards for Contaminated Soils dated December 1993".

III. REASONS FOR ISSUING AMENDMENT NO. 1

The remedy selected for the contaminated on-site soils was based on the need for protection of ground water from volatile organic compounds ("VOCs"). However, it is important to note that the ultimate groundwater protection for this Site will be provided by the source control and migration management groundwater remediation system under OU1. Soil remediation is the first line of defense for groundwater protection.

Following issuance of the 1995 ROD, ROC conducted pilot studies, additional investigations, and a remedial design at the Site. Short and long-term pilot tests of soil vapor extraction ("SVE") were conducted and included the use of hydraulic fracturing to determine the effectiveness in low permeability soils. The investigations evaluated the extent to which groundwater was contaminated, the relationship between contamination in site soils and groundwater, and the extent of soil contamination. ROC also obtained design information such as the volume and depth of contaminated soils to be excavated and an analysis of the thermal regime for Spring Creek. Findings can be found in the following documents:

- *Revised SVE Performance Test Report* (Golder Associates, November 1997),
- *Pre-Design Investigation Report* (Golder Associates, January 1998);
- *Final Focused Feasibility Study Report* (Golder Associates, February 1999); and
- *Final (100%) Design Report* (Golder Associates, June 1999)

In general, RÜTGERS Organics Corporation found that:

- Pilot test results demonstrated that SVE enhanced via hydraulic fracturing is an effective mean to withdraw large quantities of VOCs from the subsurface soil;
- Enhanced SVE can be performed in the active manufacturing area without impact to structures or utilities;
- The volume of soil to be addressed via excavation and off-site disposal was doubled during the OU1 RD, leading to a significant increase in the ROD remedy estimate;
- Significant policy and regulatory changes have occurred since the ROD was issued in 1995; and
- The groundwater treatment plant effluent will have no significant impact to the thermal regime of Spring Creek.

In addition, at the time EPA issued the 1995 ROD, the Agency considered MCLs, the maximum permissible level of contaminants allowed in water delivered to any user of a public water system, to be appropriate ground water performance standards. However, since the Commonwealth had more stringent standards in place, the groundwater performance standards in the 1995 ROD were based on the Commonwealth's requirements. Under Section 264 (i) and (j) and 264.100(a)(9) of Title 25 of the PA Code, the Commonwealth required groundwater to be cleaned up to "background" levels. Since that time, the Commonwealth's requirements have changed. On May 19, 1995, Governor Ridge signed into law the Land Recycling and

Environmental Remediation Standards Act ("Act 2"). Act 2 became effective on July 18, 1995 and established MCLs as the protective groundwater performance standard to be used in the Commonwealth of Pennsylvania.

The EPA Region III Risk Based Concentration ("RBC") for kepone of 160 ppb was referenced in the ROD. The RBC was used to determine the concentration at which kepone would be considered a RCRA listed waste as discarded material U142 for the disposition of excavated soil. However, the RBC for kepone has since been discontinued. EPA believes the elevated kepone concentrations found at the Site a result of wastewater runoff and not from the direct result of a commercial chemical product spill. Consequently, the RBC is no longer necessary since soils contaminated with wastewater runoff cannot be classified as a RCRA U-listed waste.

Also, upon further review, EPA has determined that the performance standard for a 20% reduction per year for the surface water at Thornton Spring is not mandated by any applicable or relevant and appropriate federal, state, or local statute or regulation. In addition, the NPDES discharge regulations do not apply at Thornton Spring since it is not a regulated discharge. The requirements to comply with the Pennsylvania Water Quality Standards for aquatic life will still apply at Thornton Spring.

IV. MODIFICATIONS TO THE SELECTED REMEDY

The Alternative Remedy pertains primarily to the subsurface soil component of the OU1 remedy described in the 1995 ROD; the other remedial components of the OU1 remedy will not change. The remedial objective for soil also remains unchanged: "to mitigate leaching of contaminants of concern from subsurface soil so as to be protective of groundwater". Based upon all available depth discrete soil chemistry data and the derivation of Site-specific soil-to-groundwater Medium Specific Concentrations ("MSCs") in accordance with the PADEP Land Recycling Program, the concentrations of mirex and kepone present in soil samples collected from the Site are at concentration levels which do not pose a threat to groundwater. Consequently, the only constituents in the soil which require remediation for groundwater protection are VOCs.

The Alternative Remedy will remediate those areas shown on Figures 1 and 2 where soil data indicates that VOCs are present above levels that are protective of groundwater. The Alternative Remedy involves installing overburden and bedrock SVE wells in the Tank Farm Area where most of the VOC mass is located. Additionally, SVE overburden wells will be located around Building #1, adjacent to Building #9 and at select locations in the Former Drum Staging Area and Designated Outdoor Storage Area, as required. The number, depth, construction details, and configuration of the SVE well system will be determined during remedial design.

A series of wellhead assemblies, piping (heat-traced as necessary), condensate/perched groundwater knock-out pot, blower system, and other appurtenances will be installed and the SVE effluent stream will flow to an Air Pollution Control ("APC") device for destructive treatment. The type of APC and details regarding its destructive capabilities will be addressed during the remedial design of the soil remedy.

In areas where bedrock is near the ground surface (less than 6 feet), excavation will be performed to remove VOCs instead of SVE. Excavation will still occur in all areas where mirex and kepone exceed the clean-up criteria. Excavated soils will be disposed of off-site possibly following thermal treatment, if required. Excavated soils that are determined to be hazardous (either by characteristic or by virtue of containing listed hazardous materials at elevated concentrations) will be disposed in accordance with current regulations, including the Phase IV LDR rule (63 FR 2855; May 26, 1998). This regulation allows for hazardous contaminated soil containing constituents at greater than 10 times the Universal Treatment Standard ("UTS") to be treated to achieve 90% reduction of constituents, or treated down to a concentration 10 times the UTS, whichever is greater, prior to land disposal. Based on the data generated during the Pre-Design Investigation, approximately 120 cubic yards of material may be excavated.

The overburden SVE wells will be hydraulically fractured to enhance the performance of the SVE system, i.e., increase the airflow, radii of influence, and mass removal rates. Fractures will be hydraulically induced and a sand propant injected to keep the fractures open. Overburden SVE wells in close proximity to sensitive structures may not be fractured to the extent that wells away from these structures would be. The remedial design will develop an approach to ensure that effective SVE will be implemented in a safe manner. The propagation of fractures will be monitored and safely completed in the same manner as demonstrated during the SVE performance study.

Additional enhancements to the SVE system over that used in the pilot study will include multi-phase extraction to remove perched groundwater from the area of treatment thereby increasing the effectiveness of the SVE system. Multi-phase extraction, which simultaneously extracts both soil vapor and groundwater can be accomplished by a number of different methods including the use of submersible pumps, suction tubes, low vacuum pressures, and/or high vacuum pressures. The details of the system will be determined during remedial design. The water removed from the wells and knock-out pot will be piped to the on-site groundwater treatment plant.

In order to minimize future percolation of storm water into and through subsurface soil in the operating manufacturing area and the potential leaching of subsurface soil residual constituents during and after SVE operation, certain additional engineering controls would also be instituted. The areas where the SVE system would be installed will be graded and covered with a low permeability cap consisting of asphalt or concrete pavement and/or a geomembrane/soil cover. This includes the entire Former Drum Staging and Designated Outdoor Storage Areas that are already partially paved as well as the Tank Farm/Building #1

area. Grading and paving will be performed such that stormwater will quickly drain away from the area through stormwater sewer lines or through discharge lines to the Freshwater Drainage Ditch without contacting the subsurface soil. The low permeability cap will also enhance the overall performance of the SVE system by preventing the short-circuiting of atmospheric air to the extraction wells. The low permeability pavement cap will be regularly inspected and any cracks or damaged areas would be repaired. Proper Operation and Maintenance ("O&M") is necessary to minimize future infiltration of stormwater into the subsurface and prevent short-circuiting of the SVE system from the surface during its operation and will be documented in the O&M Plan.

The OU1 ROD requires a source control and migration management groundwater remediation system. The groundwater performance standards will be Federal MCLs or the non-zero MCLGs listed in the ROD. For those contaminants of concern that do not have a MCL or MCLG, a risk-based concentration for groundwater corresponding to Hazard Quotient of 1 or a 1 $x10^{-6}$ increased cancer risk, whichever is lower, or shall be used. The contaminated groundwater plume will be pumped and treated until MCLs or the non-zero MCLGs for the contaminants of concern are achieved within the area of attainment.

It has been determined that the requirement for a twenty percent (20%) reduction each year in contaminants present in Thornton Spring surface water as part of the groundwater performance standards is not mandated by any applicable or relevant and appropriate federal, state, or local statute or regulation. In addition, the NPDES discharge regulations do not apply at Thornton Spring since it is not a regulated discharge. The requirements to comply with the Pennsylvania Water Quality Standards for aquatic life will still apply at Thornton Spring. While this requirement does not include standards for the pesticides mirex and kepone, a site-specific risk-based surface water concentration will be developed for protection of aquatic life at Thornton Spring for these two contaminants. A specific time period for compliance will not be specified, but progress will be assessed at the 5-year review required under CERCLA.

The requirement for a maintaining the background thermal regime of Spring Creek during operation of the groundwater pump and treatment system will be clarified to include the most recent State guidance regarding temperature criteria. The design and remedial action will utilize guidance from the PADEP document Implementation Guidance for Temperature Criteria (March 1995 and October 1997). This amendment is necessary to comport with State standards.

In summary, the Alternative Remedy includes all of the components of the OU1 ROD remedy except that the majority of the VOCs in soil will be removed via enhanced SVE rather than excavation; excavation will still occur where mirex and kepone exceed clean-up criteria and where bedrock is near the ground surface (< 6 feet). The groundwater performance standards will be MCLs or non-zero MCLGs. For those contaminants of concern that do not have a MCL or MCLG, a risk-based concentration for groundwater corresponding to Hazard Quotient of 1 or a 1 $x10^{-6}$ increased cancer risk, whichever is lower, or shall be used. The Alternate Remedy comprises:

- In-situ treatment by SVE to remove VOCs from the Former Drum Staging Area; the Designated Outdoor Storage Area; and the Tank Farm/Building #1 Area, including VOCs in overburden, unsaturated bedrock and in proximity to buildings and process areas;
- Use of hydraulic fracturing enhancement of SVE in overburden soils;
- Use of multi-phase extraction (soil vapor and water) to address perched water;
- On-Site treatment of extracted VOCs using an Air Pollution Control device;
- Construction of low permeability covers (asphalt or concrete) in SVE areas to reduce short circuiting of air flow and limit infiltration of precipitation;
- Soil excavation in areas of shallow bedrock where SVE is less cost-effective (depth to bedrock less than 6 feet);
- Designation of a CAMU/Staging Pile on Site to manage excavated soils;
- Soil cleanup standards based on the Act 2 methodology as included in Table 3 of this document;
- Eliminating the risk based concentration of 160 ppb for kepone;
- Adoption of an alternate LDR treatment criterion for subsurface soils of 90 percent concentration reduction or concentrations at 10 times the UTS, whichever is greater;
- Groundwater cleanup standards will be MCLs, non-zero MCLGs, or the risk-based concentrations as identified in Table 4 of this document;
- Elimination of the requirement for a 20% reduction each year and NPDES discharge regulations for contaminants in Thornton Spring; and
- Adopt State guidelines for determining thermal impacts to Spring Creek.

TABLE 3
SOIL to GROUNDWATER MEDIUM SPECIFIC CONCENTRATIONS (MSCs)
for the CENTRE COUNTY KEPONE SITE

	Chemical	Site Specific MSC Concentration (mg/kg)
1.	Acetone	124
2.	Benzene	1.22
3.	2-Butanone (Methyl Ethyl Ketone)	807
4.	Carbon Disulfide	4,966
5.	Chlorobenzene	97
6.	Chloroform	24
7.	1,2-Dichloroethene (cis)	14
8.	1,2-Dichloroethene (trans)	20
9.	1,2-Dichloropropane	1.00
10.	Ethylbenzene	624
11.	Kepone	72.737[(1)]
12.	Methylene Chloride (Dichloromethane)	0.38
13.	Mirex	570,000
14.	1,1,2,2-Tetrachloroethane	1.05
15.	Tetrachloroethene (Tetrachloroethylene)	6.06
16.	Toluene	531
17.	1,1,2-Trichloroethane	1.58
18.	Trichloroethene (Trichloroethylene)	1.92
19.	Vinyl Chloride	0.10
20.	Xylenes	14,111

Notes:
(1) - Summers Model calculations for subsurface soils with f_{oc} = 4% and natural soil cover as contained in the Feasibility Study dated October 1993.

TABLE 4
GROUNDWATER CLEAN-UP LEVELS
for the CENTRE COUNTY KEPONE SITE

	Chemical	MCL (µg/l)	MCLG (µg/l)	Risk-based Concentration (µg/l)
1.	Acetone	-	-	610
2.	Benzene	5	0	-
3.	2-Butanone (MEK)	-	-	1,900
4.	Carbon Disulfide	-	-	1,000
5.	Chlorobenzene	-	-	110
6.	Chloroform	100	0	-
7.	1,2-Dichlorobenzene	600	600	-
8.	1,2-Dichloroethane	810	-	-
9.	1,2-Dichloroethane	5	0	-
10.	1,1-Dichloroethene	7	7	-
11.	1,2-Dichloroethene	70	70	-
12.	1,2-Dichloropropane	5	0	-
13.	Ethylbenzene	700	700	-
14.	Kepone	-	-	TBD
15.	Methylene Chloride	-	-	4.1
16.	Mirex	-	-	TBD
17.	1,1,2,2-Tetrachloroethane	-	-	0.05
18.	Trichloroethene	5	0	-
19.	Tetrahydrofuran	-	-	8.8
20.	Toluene	1,000	1,000	-
21.	1,1,1-Trichloroethane	200	200	-
22.	1,1,2-Trichloroethane	5	3	-
23.	Trichloroethene	5	0	-
24.	Vinyl Chloride	2	0	-
25.	Xylenes	10,000	10,000	-

Notes:
TBD - To be determined

V. EVALUATION OF ALTERNATIVES

The Alternative Remedy has been evaluated according to the nine criteria in the NCP 40 C.F.R. 300.430(e)(9) as set forth in "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA, October 1988), and "*A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*" (EPA 540-R-98-031, July 1999). These nine criteria can be further categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria, as follows:

Threshold Criteria

- Overall protection of human health and the environment
- Compliance with applicable or relevant and appropriate requirements (ARARs)

Primary Balancing Criteria

- Long-term effectiveness
- Reduction of toxicity, mobility or volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Modifying Criteria

- Community Acceptance
- State Acceptance

These evaluation criteria relate directly to requirements in Section 121 of CERCLA, 42 U.S.C. § 9621. Threshold criteria must be satisfied in order for a remedy to be eligible for selection. Primary balancing criteria are used to weigh major trade-offs between alternatives. Acceptance by the State and Community are modifying criteria formally considered after public comment is received on the Proposed Plan. A discussion of each criterion relative to both the OU1 ROD remedy and the Alternative Remedy is presented below.

A. Overall Protection of Human Health and the Environment

The Alternative Remedy provides a higher degree of protection of human health and the environment because it has a greater potential for removing substantially more mass of VOC from the subsurface soil which could possibly impact groundwater. While the OU1 ROD remedy and the Alternate Remedy will provide significant reduction of total VOC, enhanced SVE has the potential to remove more mass from the tank farm area in addition to areas where excavation cannot be implemented such as in the unsaturated bedrock zone and in the Building #1 Area. Consequently, the Alternative Remedy is more protective of groundwater than the OU1 ROD remedy.

Both alternatives provide an equivalent degree of protection of human health and the environment with respect to direct exposures to Site soils in the operating manufacturing area. The Baseline Risk Assessment demonstrated that there are no unacceptable risks associated with trespassers or worker exposures to on-site soils. In addition, the recent placement of deed restrictions prohibits the future residential use of the property. Consequently, neither alternative is required to address direct exposures and, as such, both are equally protective.

The comparison of the SVE and excavation alternatives in the OU1 ROD incorrectly states that the alternatives "will result in the permanent removal of all contaminants of concern for the soils at the Site." In fact, both technologies will leave some residual levels of contamination in-place as a result of the inaccessibility to certain areas of the Site. Importantly, the excavation alternative will leave far more residual VOC in Site soils, unsaturated bedrock, and perched groundwater than SVE, which would pose more of a potential threat to groundwater. The Alternative Remedy will leave less residual VOCs in-place and will also provide infiltration controls (low permeability pavement cover and surface water management), which will mitigate the infiltration of precipitation through the soil. These infiltration controls will be in addition to those which have previously been specified in the OU1 ROD. Thus, the Alternative Remedy provides an additional precautionary measure designed to be protective of groundwater.

For all of the reasons stated above, the Alternative Remedy provides a higher degree of protection of human health and the environment in that it will remove more VOC mass from the subsurface and as a result will be more protective of groundwater at the Site. However, it should be noted that the source control and migration management groundwater extraction systems are integral to providing overall protection of groundwater.

B. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

At the time of the 1995 ROD, the Commonwealth of Pennsylvania identified Section 264.97(i) and (j) and 264.100(a)(9) of Title 25 of the PA Code as an ARAR for the Site. Under the NCP, EPA is required to consider state ARARs that are more stringent than federal requirements. Since the Commonwealth regulations required that groundwater be cleaned up to a more stringent level, the groundwater performance standards in the 1995 ROD conformed to these more stringent standards.

For this ROD Amendment, PADEP has identified the Land Recycling and Environmental Remediation Standards Act, 95 Pa. Laws 2 ("Act II"), as an ARAR for this remedy; however, EPA has determined that Act II does not on the facts and circumstances of this remedy, impose any requirements more stringent than the federal standards, except with regard to soil clean-up standards. Accordingly, groundwater cleanup Maximum Contaminant Levels and non-zero Maximum Contaminant Level Goals as set forth in accordance with Section 300g-1 of the Safe Drinking Water Act, 42 U.S.C. Section 1412, and its implementing regulations at 40 C.F.R. Part 141 are relevant and appropriate.

Furthermore, EPA has determined that the soil-to groundwater MSCs presented in Act II are ARARs. Based on the following site specific factors, EPA decided for this Site that Act II clean-up numbers would be acceptable rather than using risk-based concentrations: 1) the Site is an active manufacturing plant that is bound by a Consent Decree to implement the remedy specified in the OU1 ROD, 2) the contaminated soil borders and underlies an operating plant and tank farm, 3) the area where soil remediation will take place is within the capture zone of the extraction wells and groundwater treatment system, and 4) if implemented, the SVE system will be operated until there are several types of confirmation that removal of contaminants is done to the extent practicable. The clean-up may exceed Act II standards, if practical. Therefore, both the 1995 ROD remedy and the Alternative Remedy comply with ARARs.

EPA, however, has not adopted the soil-to-groundwater MSC for kepone as an ARAR. Act II recognizes that site specific cleanup levels for contaminants may be developed based upon a site specific risk assessment. EPA does not recognize the Act II "process" for performing a risk assessment as an ARAR. Nevertheless, EPA's risk assessment has demonstrated that the proposed cleanup standard for kepone will be protective of groundwater, human health, and the environment.

As stated in the OU1 ROD, there are no ARARs pertinent to the development of cleanup levels for the contaminated soil at the Site. In addition, both alternatives contain an excavation component and both alternatives will comply with the Federal and Pennsylvania Solid and Hazardous Waste Regulations cited in the OU1 ROD. As such, both alternatives will comply with ARARs.

Both the 1995 ROD and Alternative Remedy are designed to work in conjunction with the source control and migration management groundwater extraction systems. Accordingly, the remedial alternatives discussed in this ROD Amendment, including the selected alternative, will comply with all ARARs including the ARARs identified and discussed in the OU1 ROD remedy.

C. Long-term Effectiveness and Permanence

Full scale field testing of enhanced SVE demonstrated that the Alternative Remedy will provide a high level of long-term effectiveness and permanence for remediating VOCs in site soils and for helping to meet the overall remedial action objective for the protection of groundwater. The Alternative Remedy will also provide long-term effectiveness for removing VOCs from perched groundwater in the Tank Farm Area and from unsaturated bedrock. Furthermore, the Alternative Remedy provides a low permeability cover and surface water management which will mitigate future percolation of storm water through residuals in subsurface soil.

Where accessible, the OU1 ROD remedy will also be effective for removing VOCs from subsurface soil. However, the OU1 ROD remedy's effectiveness is limited since it cannot be implemented in certain areas of the Tank Farm and in production areas of the Site that must remain in operation. The OU1 ROD remedy is also not effective for removing VOCs from the unsaturated bedrock. Thus, VOCs will be left in place. Consequently, the Alternative Remedy provides a higher degree of long-term effectiveness than the OU1 ROD remedy.

Both the OU1 ROD remedy and the Alternative Remedy provide for the permanent removal of VOCs from the Site. However, the Alternative Remedy provides a higher degree of permanence than the excavation alternative because 1) it provides greater VOC mass removal from soils and unsaturated bedrock and 2) provides a permanent destructive treatment of the extracted VOCs. The OU1 ROD remedy cost estimate did not include any treatment of VOCs prior to land disposal. A revised cost estimate in the FFS was prepared and provides for treatment prior to land disposal at an additional cost of approximately $9,000,000.

Monitoring the effectiveness of the VOC removal (performance monitoring) as stated in the OU1 ROD, will be more difficult for the Alternative Remedy than for an excavation remedy in cases where there are no accessibility restrictions. However, given the limitations of excavation, monitoring the performance of excavation to meet the remedial action objective for groundwater protection will be similarly or even more difficult. Performance of SVE can be assessed through a number of methods including direct subsurface soil sampling, calculations of mass removal via the SVE system, and asymptotic performance monitoring, details of which will be developed during the Remedial Design.

Altogether, the Alternative Remedy provides a higher degree of long-term effectiveness and permanence than the OU1 ROD remedy.

D. Reduction of Toxicity, Mobility, or Volume Through Treatment

The Alternative Remedy provides a higher degree of reduction of toxicity and volume through treatment primarily as a result of the destruction of extracted VOC vapors by on-Site treatment and treatment of extracted VOCs in perched groundwater. Contrary to what is stated in the OU1 ROD, the excavation remedy will provide little, if any, permanent reduction of toxicity and volume unless the excavated soil removed by the OU1 ROD excavation remedy is treated using a destruction technology (such as incineration). According to the OU1 ROD cost estimate, VOCs will be simply excavated from the ROC Site and then placed untreated into a landfill and as a result, will provide little, if any, reduction of toxicity and volume. The cost estimate for the OU1 ROD excavation remedy would need to be increased by about $9 million in order for the remedy to provide any significant reduction of toxicity and volume.

Both alternatives are estimated to provide reduction of mobility. The Alternative Remedy includes the installation of a low permeability cover and surface water controls to limit infiltration through subsurface soils. The OU1 ROD excavation remedy will place soil into a landfill for containment. However, the excavation remedy does not address the future leaching potential of residual VOCs left in the subsurface.

Altogether, the Alternative Remedy provides greater reduction of toxicity and volume as a result of addressing a larger amount of VOC mass and providing the destructive treatment of the extracted VOCs. The excavation remedy addresses a smaller amount of VOC mass and does not provide treatment as it is presently costed in the OU1 ROD.

E. Short-term Effectiveness

The Alternative Remedy has only limited short-term effectiveness concerns even though it will take longer to implement. Published literature concurred with this assessment. Conversely, there are serious potential short-term impacts associated with the OU1 ROD remedy as a result of the anticipated need to control VOC/dust/odors during excavation, disruption of plant activities and health and safety concerns for remediation workers, plant employees, and potential off-site receptors.

The SVE system should be able to extract and treat the majority of the VOC mass in about 2.5 years (the data suggest cleanup times ranging from 1.5 to 3.5 years and a duration of 3.5 years has been used for costing purposes). Most of the adverse short-term impacts (even though limited in nature) would occur during system installation which could easily be completed in a single construction season. SVE is a process that minimizes exposure to site personnel, the public, and surrounding environment and, once installed, will result in minimal disruptions. No significant issues are associated with the installation of the SVE wells and piping system and hydraulic fracturing was shown to be implementable in the operating manufacturing area without adverse effects.

In summary, contrary to what was stated in the OU1 ROD, the Alternative Remedy is expected to result in considerably less short-term effects than excavation. Both the OU1 ROD excavation remedy and the Alternative Remedy can be constructed in one construction season. The Alternative Remedy will require operation for at least 2.5 years for removal of the majority of VOCs. The significant adverse short-term effects that could result from the excavation remedy severely questions the feasibility and appropriateness of its use.

F. Implementability

The Alternative Remedy is expected to be more easily implemented than the OU1 ROD remedy. The performance study demonstrated that not only is enhanced SVE with limited excavation an effective method for removing VOC in saturated low permeability soil, SVE well installation, hydraulic fracturing and the removal of perched water are feasible in the operating manufacturing area. In addition, the equipment and services needed to implement the enhanced SVE system are becoming more routine and are widely available. Moreover, USEPA has identified enhanced SVE as a presumptive remedy and preferred technology for similar site conditions. Limited soil excavation in open areas is also easily implemented.

Conversely, the large scale excavation in close proximity to on-going plant operations is expected to be extremely difficult to implement. While the equipment and services required to implement routine excavation/disposal operations are conventional and widely available, controlling VOC emissions and controlling odors, if needed to prevent plant disruption and to protect remedial workers, plant employees, and off-site receptors is expected to be extremely difficult to implement.

G. Cost

New and significant technical information developed during the predesign investigation for the OU1 remedial design have caused the cost estimate in the OU1 ROD to be significantly increased from $4.4 million to $13.5 million primarily as a result of excavating a larger volume and providing treatment of the soil prior to disposal. The estimated cost for the Alternative Soil Remedy is about $2 million assuming a 3.5 year period for cleanup.

H. State Acceptance

In its March 2, 2001 letter, the Commonwealth of Pennsylvania concurred with EPA's choice of remedy selected in the ROD Remedy as Amended, but noted that the cleanup level for kepone exceeded the MSC under Act II. The Commonwealth of Pennsylvania did not contest EPA's conclusion that the cleanup level for kepone was protective, but rather that EPA had failed to perform an equivalency demonstration pursuant to PADEP's regulations under Act II. EPA does not recognize the Act II equivalency demonstration process to set site specific standards as an ARAR. Nevertheless, EPA did perform a site specific risk assessment and determined that the cleanup level for kepone was protective of groundwater, human health, and the environment. EPA's risk assessment meets all the substantive requirements of PADEP's Act II equivalency demonstration process even though EPA did not accept this as an ARAR.

VI. SUPPORT AGENCY COMMENTS

All of the above changes to the remedy have been coordinated with representatives of PADEP pursuant to 40 C.F.R. § 300.435(c)(2).

VII. AFFIRMATION OF THE STATUTORY DETERMINATIONS

EPA has determined that the revised remedy complies with the statutory requirements of CERCLA § 121, 42. U.S.C. § 9621. Considering the new information that has been developed, EPA believes that the remedy remains protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to this Remedial Action as described in the ROD for OU1 for this Site, and is cost-effective. In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site.

The Revised Remedy in this ROD Amendment will be protective of human health and the environment for Site-related contaminants over time because Site-related contaminants in the groundwater will be permanently removed through the existing extraction and treatment system.

VIII. PUBLIC PARTICIPATION

A thirty day public comment period began on August 16, 2000 and ended September 14, 2000. A public meeting was held on August 28, 2000 at the Mount Nittany Middle School in State College, PA. The Administrative Record includes the ROD for OU1 and all documents that formed the basis for EPA's selection of the cleanup remedy in the ROD. A Proposed Amendment to the Record of Decision and other related documents and the information upon which it is based have been included in the Administrative Record file and the information repository for this Site. The Administrative Record is available for public review at the following locations:

U.S. EPA, Region III
1650 Arch Street
Philadelphia, PA 19103-2029
Hours: Mon. - Fri., 9:00 a.m. - 4:00 p.m.

Schlow Memorial Library
100 East Beaver Avenue
State College, PA 16801
(814) 237-6236
Hours: Mon. - Wed., 9:00 a.m. - 9:00 p.m.
Thurs., noon - 9:00 p.m.
Fri., 9:00 a.m. - 6:00 p.m.
Sat., 9:00 a.m. - 5:00 p.m.
Sun., 1:30 p.m. - 5:00 p.m. (Sept. to May)

The notice of availability of these documents was published in the Centre Daily Times, State College, PA.

3/8/01
Date

Abraham Ferdas, Director
Hazardous Site Cleanup Division
U.S. EPA Region III

Figure 1

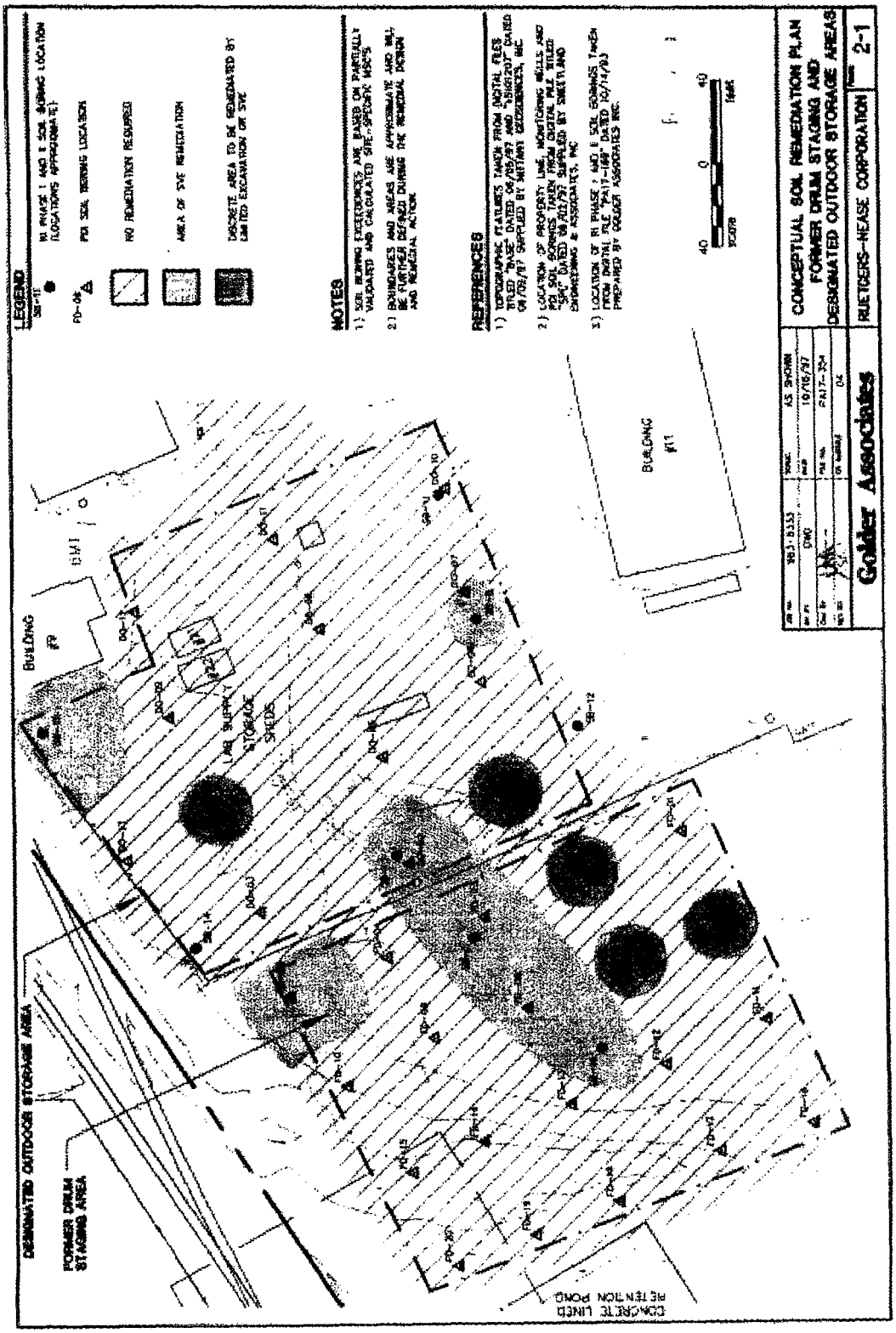
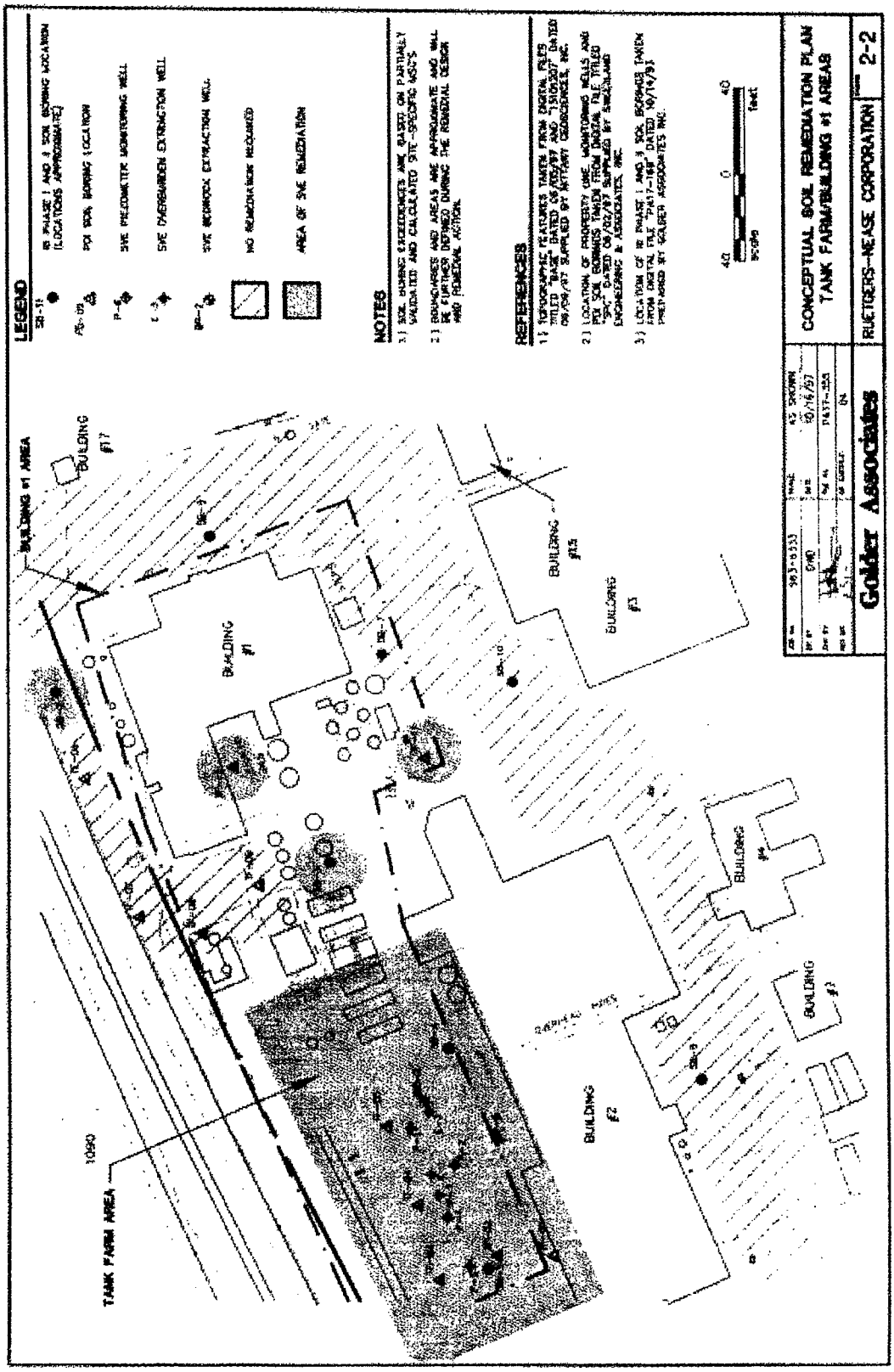

DESIGNATED OUTDOOR STORAGE AREA
FORMER DRUM STAGING AREA
BUILDING #9
BUILDING #11
LAB SUPPLY STORAGE SHEDS
CONCRETE LINED RETENTION POND
LEGEND
RI PHASE I AND II SOIL BORING LOCATION (LOCATIONS APPROXIMATE)
RDI SOIL BORING LOCATION
NO REMEDIATION REQUIRED
AREA OF SVE REMEDIATION
DISCRETE AREA TO BE REMEDIATED BY LIMITED EXCAVATION OR SVE
NOTES
1) SOIL BORING EXCEEDANCES ARE BASED ON PARTIALLY VALIDATED AND CALCULATED SITE-SPECIFIC MCPS
2) BOUNDARIES AND AREAS ARE APPROXIMATE AND WILL BE FURTHER DEFINED DURING THE REMEDIAL DESIGN AND REMEDIAL ACTION
REFERENCES
1) TOPOGRAPHIC FEATURES TAKEN FROM DIGITAL FILES TITLED "BASE" DATED 04/05/97 AND "BASE2" DATED 04/09/97 SUPPLIED BY METHANE DEVELOPMENT, INC
2) LOCATION OF PROPERTY LINE, MONITORING WELLS AND SOIL BORINGS TAKEN FROM DIGITAL FILE TITLED "SB" DATED 08/01/97 SUPPLIED BY SMITH AND GREENING & ASSOCIATES, INC
3) LOCATION OF RI PHASE I AND II SOIL BORINGS TAKEN FROM DIGITAL FILE "PA17-1BF" DATED 10/14/93 PREPARED BY GOLDER ASSOCIATES INC
40 0 40
SCALE IN FEET
CONCEPTUAL SOIL REMEDIATION PLAN
FORMER DRUM STAGING AND DESIGNATED OUTDOOR STORAGE AREAS
Golder Associates
RUETGERS-NEASE CORPORATION
2-1

Figure 2


LEGEND
NOTES
REFERENCES
BUILDING #1 AREA
TANK FARM AREA
BUILDING #1
BUILDING #2
BUILDING #3
BUILDING #4
BUILDING #5
BUILDING #7
CONCEPTUAL SOIL REMEDIATION PLAN
TANK FARM/BUILDING #1 AREAS
Golder Associates
RUETGERS-NEASE CORPORATION
2-2

APPENDIX E

RESPONSIVENESS SUMMARY
FOR AMENDMENT NO. 1
TO THE RECORD OF DECISION
AT THE
CENTRE COUNTY KEPONE SUPERFUND SITE
OPERABLE UNIT #1
STATE COLLEGE, CENTRE COUNTY, PENNSYLVANIA

Public Comment Period:
August 16, 2000 thru September 14, 2000

CENTRE COUNTY KEPONE SITE
OPERABLE UNIT #1

RESPONSIVENESS SUMMARY FOR AMENDMENT NO. 1 TO THE RECORD OF DECISION

TABLE OF CONTENTS

RESPONSIVENESS SUMMARY
CENTRE COUNTY KEPONE SITE
OPERABLE UNIT #1
STATE COLLEGE, PENNSYLVANIA

This community relations responsiveness summary is divided into the following sections:

Overview: This section discusses EPA's Amendment No. 1 to the Record of Decision (ROD) for the remediation of the Site.

Background: This section provides a brief history of community interest and concerns raised during remedial planning at the Centre County Kepone Site (Site).

Part I: This section provides a summary of commentors' major issues and concerns, and expressly acknowledges and responds to those raised by the local community. "Local community" may include local homeowners, businesses, the municipality, and potentially responsible parties (PRPs).

Part II: This section provides a comprehensive response to all significant comments and is comprised primarily of the specific legal and technical questions raised during the public comment period. If necessary, this section will provide technical detail to answers responded to in Part I.

Any points of conflict or ambiguity between information provided in Parts I and II of this responsiveness summary will be resolved in favor of the detailed technical and legal presentation contained in Part II.

OVERVIEW

On August 16, 2000, EPA announced the opening of the public comment period regarding its proposed Amendment No. 1 to the ROD for the Centre County Kepone Site, Operable Unit #1 located in State College, Centre County, Pennsylvania. EPA is proposing the amendment as result of new information which includes, but is not limited to, the following: Soil Vapor Extraction (SVE) Performance Test Report, November 1997; Pre-Design Investigation Report, January 1998; Final Focused Feasibility Study Report, February 1999; Final (100%) Design Report, June 1999, and documentation requesting changes to the ROD, July 1999.

In the process of deciding upon the amendment of the ROD to remediate the Site, consideration was given to nine key evaluation criteria below:

Threshold Criteria

- Overall protection of human health and the environment
- Compliance with applicable or relevant and appropriate requirements (ARARs)

Primary Balancing Criteria

- Long-term effectiveness
- Reduction of toxicity, mobility or volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Modifying Criteria

- Community Acceptance
- State Acceptance

EPA carefully considered state and community acceptance of the amendment prior to reaching the final decision regarding the amendment.

The Agency's preferred amendment to the remedy is outlined below. Based on current information, this Amendment provides the best balance with respect to the above nine criteria EPA uses to evaluate remediation alternatives. The amendment to the ROD includes the following:

1. Modifying the soil remediation by reducing the scope for excavation of contaminated on-site soils and requiring that the majority of contaminated on-site soils be remediated in-situ via Enhanced SVE. Enhancements to the SVE system will include the use of hydraulic fracturing, multi-phase extraction, and the placement of a low permeable pavement cap. Excavation will still occur where mirex and kepone exceed the clean-up criteria and where bedrock is near the ground surface (less then 6 feet).

2. Modifying the soil clean up standards to correspond with the Commonwealth of Pennsylvania's Act II standards.

3. Eliminating the use of the EPA Region III's Risk Based Concentration (RBC) of 160 ppb for kepone for the disposition of excavated soil. EPA believes the elevated kepone concentrations found at the Site are a result of wastewater runoff and not from the direct result of a commercial chemical product spill.

4. Modifying the cleanup standard per Pennsylvania Department of Environmental Protection (PADEP) current regulations for groundwater in the area of attainment from "background" levels to the Maximum Contaminant Levels (MCLs) or the non-zero Maximum Contaminant Level Goals (MCLGs) listed in the ROD.

5. Eliminating the 20% reduction requirement each year and the National Pollution Discharge Elimination System (NPDES) discharge regulations for contaminants present in Thornton Spring surface water as part of the groundwater performance standards. The requirements to comply with the Pennsylvania Water Quality Standards for aquatic life will still apply at Thornton Spring.

6. Clarifying the Spring Creek thermal regime requirement(s) to reference current State guidance.

BACKGROUND

Community interest and concern about the Site has been moderate throughout EPA involvement. EPA and the Commonwealth of Pennsylvania conducted an initial public meeting in State College, Pennsylvania on September 11, 1990 to inform residents of the cleanup process and activities which would take place at the Site. On September 6, 1991, a Technical Assistance Grant (TAG) of $50,000 was issued to a local citizens' group for the purpose of hiring an independent technical consultant to assist the group in understanding and commenting on technical documents for the Site. However, the grant was terminated on August 15, 1992 because the TAG recipient was dissolved. EPA issued a Fact Sheet which provided the results of the Phase I Remedial Investigation and outlined Phase II activities in May of 1992.

To obtain public input on the Proposed Remedial Action Plan (Proposed Plan or PRAP), EPA held a public comment period from October 3, 1994 to December 1, 1994. In addition, EPA held a public meeting on October 19, 1994 at the State College Area High School, State College, Pennsylvania, to discuss issues related to the Proposed Plan. EPA issued public notification of the October 19, 1994 meeting to local media, area residents, and Federal, state and local officials on EPA's Site mailing list. EPA also announced the opening of the public comment period in a newspaper display ad placed in the Centre Daily Times. Local area residents, state, county, and local officials, news media representatives, EPA representatives, activities and clean-up decision makers attended the meeting.

In August 2000, EPA announced a proposed change to the cleanup plan for the Site (Amendment No. 1 to the ROD). To obtain public input on the proposed ROD Amendment, EPA held a public comment period from August 16, 2000 to September 14, 2000. In addition, EPA held a public meeting on August 28, 2000 at the Mount Nittany Middle School, State College, Pennsylvania, to discuss issues related to the Proposed Amendment. EPA issued public notification of the August 28, 2000 meeting to local media, area residents, and Federal, state and local officials on EPA's Site mailing list. EPA also announced the opening of the public comment period in a newspaper display ad placed in the Centre Daily Times. Local area residents, state and local officials, news media representatives, EPA representatives, and representatives from companies interested in the Site activities and clean-up decisions attended the meeting.

EPA also established a Site information repository at the Schlow Memorial Library. The repositories contain the Community Relations Plan, the Remedial Investigation/Feasibility Study (RI/FS) report, the Proposed Plan, and other relevant documents. EPA also houses its Administrative Record, encompassing the key document the Agency used in selecting the Site remedy, at the Schlow Memorial Library.

Subsequent to the August 28, 2000 public meeting, the EPA and/or PRP have met/communicated with representatives of several interested community groups in the State College, PA area and corresponded with local elected state and federal officials. On September 20, 2000, a presentation/discussion was held with the Community Advisory Council (CAC) of RUTGERS Organics' State College Plant. The CAC comprises twelve local citizens who represent the community directly surrounding the Site. RUTGERS Organics Corporation sent informational letters to all local elected state and federal officials on September 20, 2000. A presentation/discussion was held on September 28, 2000 at Pennsylvania State University with students and staff. Another presentation/discussion was held with EPA on November 15, 2000 with the Spring Creek Watershed Community. On November 28, 2000, a presentation/discussion was held at the Spring Creek Watershed Commission. Lastly, in December 2000, RUTGERS Organics Corporation sent copies of their NEIGHBORS newsletter to 3,900 residents in the State College area.

PART I: SUMMARY OF COMMENTORS' MAJOR ISSUES AND CONCERNS

This section provides a summary of commentors' major issues and concerns, and expressly acknowledges and responds to those raised by the local community at the public meeting on August 28, 2000, and during the pubic comment period. The major issues and concerns about the remedy for the Centre County Kepone (Operable Unit #1) Site can be grouped into three categories:

A. Soil Vapor Extraction (SVE) Concerns
B. Cleanup Criterial For Soil and Groundwater Discharges
C. Health And Environmental Concerns

The questions, comments, and responses are summarized below.

A. Soil Vapor Extraction Concerns

1. The soil conditions at the Site indicate that the proposed Enhanced SVE remedy will not be successful and any enhancements, such as hydraulic fracturing, will probably not have a significant impact in increasing the system's removal efficiency.

   EPA Response: *An 11-month Pilot Study was conducted at full-scale for the purpose of establishing whether the Enhanced SVE technology would be effective in the soil*

conditions at this Site. The design and results of these studies were reviewed by EPA's experts at the EPA Office of Research & Development as well as by PADEP. These reviews concurred that, with hydraulic fracturing enhancement, Enhanced SVE was highly effective in removing Volatile Organic Compounds (VOC) contamination at the Site. EPA evaluated fracture enhancements in its 1997 publication "Analysis of Selected Enhancements for Soil Vapor Extraction" (EPA 542-R-97) and found it to be proven effective in soils of the type present at the Site. EPA also includes the Enhanced SVE as a presumptive remedy as indicated in its July 1996 publication "User's Guide to the VOCs in Soils Presumptive Remedy" (EPA 540/F-96/008) and April 1997 publication "Presumptive Remedy: Supplemental Bulletin Multi-Phase Extraction (MPE) Technology for VOCs in Soil and Groundwater" (EPA 540-F-97-004). Lastly, Enhanced SVE has been successfully implemented on other sites including the McGraw Edison Superfund Site in Centerville, Iowa (Region 7).

2. How will the removal efficiency of the Enhanced SVE system be accurately measured and how will EPA determined when the cleanup criteria has been met to turn off the system?

EPA Response: *The removal efficiency of the Enhanced SVE system will be measured utilizing historic and pre-design soil sampling results in conjunction with vapor and groundwater sampling results from monitoring wells and the system's influent streams. Intermediate sampling intervals will be developed as part of the required design criteria to properly monitor the effectiveness of the remedial strategy. The Enhanced SVE system will also be periodically cycled to assure that a rebound in contaminant concentrations does not occur. Lastly, final soil sampling will be performed to verify that all clean-up standards(per the ROD) have been met prior to removing the system from service.*

3. Since the SVE air discharge will require treatment prior to being released into the atmosphere, what is the specific process to be used for the air treatment? Can references be provided for sites where the proposed air treatment process has been implemented successfully?

EPA Response: *Based on the characteristics of the vapor stream, it is anticipated that a Regenerative Thermal Oxidizer (RTO) will be used to destroy the contaminants in the vapor stream and a scrubber to treat the RTO exhaust. The RTO will operate at approximately 1600EF and will be equipped with instrumentation to monitor the combustion chamber temperature of the system. Similar RTOs have been used at the Safety Kleen's solvent recovery facilities in Illinois and Texas. Additionally, a RTO unit is successfully being operated at the present groundwater treatment facility at the Centre County Kepone Site.*

4. It appears that more appropriate and effective remedial technologies exist that should be considered by EPA, including solidification/stabilization, soil washing, slurry wall containment and soil excavation beneath buildings.

EPA Response: *A comprehensive Feasibility Study (FS) was undertaken to evaluate the full range of technologies in accordance with EPA guidance. Solidification/stabilization and soil washing technologies were specifically evaluated in the FS, and EPA determined that they would not be as effective for addressing the VOC contamination that must be remediated at the Site. Subsequent general technology evaluations by EPA confirm this to be the case. As noted in the Proposed ROD Amendment, "EPA has identified enhanced SVE as a presumptive remedy and preferred technology for similar site conditions." (p. 19) A presumptive remedy is technology or method that is acceptable for use under specific site conditions. Solidification/stabilization would not result in contamination being removed or destroyed.*

Slurry wall containment would not remove or destroy any of the contamination. Furthermore, it would not address the downward leaching of VOCs from the soil into bedrock groundwater. The clear remedial objective is to prevent downward migration of contaminants into the bedrock. Lastly, a slurry wall within the bedrock would not be an effective cut-off due to the karst limestone hydrogeologic conditions.

While soil excavation has been accomplished beneath conventional buildings for foundation repairs, it has not, to our knowledge, ever been accomplished beneath an active chemical plant for environmental remediation reasons. Excavation beneath the active tank farm and chemical manufacturing plant would be hampered by underground utilities and would have major health and safety risks to construction workers, plant workers and the community. By the way of contrast, there are multiple examples of the successful use of SVE for remediation of VOC contamination beneath buildings, contributing to its status as EPA's presumptive remedy in these circumstances.

5. Why is the proposed SVE remedy being considered if it does not treat kepone and mirex?

EPA Response: *Notwithstanding the historic name of the Superfund site (which predates much of the investigation), almost all the health risk posed by the site soils is associated with volatile organic compounds (VOCs) leaching to groundwater and not with the pesticides kepone and mirex. EPA has therefore focused on ways to achieve greater treatment of soil VOCs. The Enhanced SVE remedy is a better option to treat and remediate VOCs. Kepone and mirex in excess of the clean-up standards will still be excavated per the 1995 ROD.*

The primary purpose of the soil remedy is not to address kepone and mirex in soil but rather to remove a source of VOCs that could continue to impact groundwater quality.

The modified soil remedy will work in concert with the groundwater remedy (that has already been constructed) so as to maximize the efficiency of groundwater remediation.

B. Cleanup Criteria For Soil and Groundwater Discharges

1. Can EPA provide a more detailed explanation as to why the Risk Based Concentration of 160 ppb is being eliminated for kepone?

EPA Response: *EPA currently believes that elevated kepone concentrations found at the Site are a result of wastewater runoff and not from the direct result of a commercial chemical product spill. Soils contaminated by wastewater runoff are not classified as a RCRA U-listed waste. This clarification has no effect on the remedy being performed at the Site. This decision only affects the manner in which excavated soils will be classified for treatment and disposal.*

2. What implications will removing the RBC for kepone have on the overall remediation strategy and cleanup criteria at the Site?

EPA Response: *This clarification has no effect on the remedy being performed at the Site. EPA has not changed the kepone soil cleanup standard from the 1995 ROD. The only proposed change regarding kepone is to clarify that, once excavated, the disposal of soil containing kepone must satisfy current regulations. Assessment of the disposal requirements is a site-specific determination that will be made by EPA once excavation has been completed, and will take full account of all available information in compliance with the current regulations.*

3. Why is EPA changing the discharge standards for Thornton Spring and will this have a negative affect on Spring Creek?

EPA Response: *EPA is correcting certain provisions of the 1995 ROD that were not in accordance with applicable law and regulation. The Proposed Amendment requires that the Thornton Spring discharge comply with Pennsylvania Water Quality Standards for aquatic life and so Thornton Spring and Spring Creek will be fully protected.*

4. Why is it not necessary to excavate and remove as much of the kepone and mirex contamination in the soil as possible?

EPA Response: *As previously stated, almost all the health risks posed by the site soils is associated with volatile organic compounds (VOCs) leaching to groundwater and not with the pesticides kepone and mirex. Therefore it is important to focus on the removal of the VOCs from the soil to reduce these health risks. Kepone and mirex in excess of the clean-up standards will still be excavated per the 1995 ROD. After excavation, the concentrations of the remaining kepone and mirex will be low (below the clean-up*

standard) and immobile. Furthermore, the existing groundwater extraction and treatment system will prevent the possibility of off-site migration of any remaining mirex and kepone.

C. Health and Environmental Concerns

1. What are the human health risks and environmental implications associated with using the Enhanced SVE system instead of excavating the contaminated soil?

EPA Response: *EPA is confident that the human health risks and environmental implications associated with using the Enhanced SVE system will be lower than the risks and implications associated with excavation of the VOC contaminated soil. This is especially true when evaluating the short-term effectiveness of the SVE remedy. Essentially no emissions will occur during the execution of the Enhance SVE soil remedy and the risk of human contact with contaminated materials is very minimal. All vapors collected during the SVE remedy will be treated by an oxidizer which will destroy the harmful vapors to inert compounds. Since very little soil will be handled, the opportunity to of human contact with contamination is limited. Whereas the excavation remedy will allow greater opportunity for emissions to occur and the risk of human contact with contaminated materials is much greater than that associated with the SVE remedy.*

2. Does the discharge from the new groundwater recovery/treatment system currently impact the thermal regime of Spring Creek?

EPA Response: *Prior to the start-up of the groundwater recovery/treatment system, the PRP prepared a detailed model to predict any thermal impact of the discharge on the thermal regime of Spring Creek. This model took into account the worst case assumptions. Experts from both PADEP and EPA reviewed the model and concurred that there would not be a negative thermal impact to Spring Creek as a result of the treatment system's discharge. However, since the treatment system has only been in operation for a short time (less than one year), EPA is still evaluating this model with respect to field measurements. As part of this evaluation, an on going thermal monitoring program is being performed by the PRP. This monitoring program includes continuous measurement of the temperature of Spring Creek immediately up and down stream of the discharge point. This data will be utilized to verify the model.*

3. How will the air discharged from the pollution control device be monitored to assure that compounds such as dioxins will not be released into the atmosphere?

EPA Response: *The Proposed ROD Amendment notes that the regenerative thermal oxidizer (RTO), installed as part of the groundwater remedy, will treat the VOCs that are extracted (p.2). This unit is required to fully satisfy the requirements of both EPA and PADEP air quality regulations so as to be protective of human health and the*

environment.

Since the design of the proposed Enhanced SVE system is ongoing, exact details are not available regarding the devices to be used to monitor the proposed RTO. However, it will be required that the RTO unit will be equipped with instrumentation to accurately monitor and record the RTO combustion chamber temperature, scrubbing solution pH, and scrubbing solution flow rate on a continuous basis whenever the oxidizer is in use. When these parameters deviate from a set operating range (set forth by PADEP), the entire treatment system will automatically shut down and an alarm activated to notify on-site personnel.

Lastly, the formation of dioxins is not expected to be an issue for this treatment process. The formation of dioxins generally occurs when dry particulate matter exist at temperatures between 400EF and 750EF. At higher temperatures and in the absence of particulates, dioxin formation is not expected. Since this system introduces virtually no particulate matter to the RTO and the system will be operating at 1600EF, the formation of dioxins is unlikely.

4. Since the proposed SVE remedy will leave more of the kepone and mirex in the ground compared to the excavation remedy, it appears that Spring Creek will continue to be contaminated by kepone/mirex and the present no kill regulations for trout will not be lifted.

EPA Response: *The proposed ROD Amendment does not change EPA's approach to the remediation of groundwater that ultimately discharges, via Thornton Spring, to Spring Creek. The groundwater remedy selected by EPA in 1995 has been designed and constructed in 2000 and preliminary indications are that it will be effective in containing the contaminated groundwater discharging to Thornton Spring. The proposed amendments to the soil remedy will result in removal of a greater mass of VOC contamination (that could impact groundwater) than the approach previously proposed. Kepone and mirex in excess of the clean-up standards will be excavated per the 1995 ROD. In fact, mirex and kepone concentrations in fish tissue have been exhibited a downward trend and are now below the Food and Drug Administration (FDA) advisory levels for consumption.*

PART II: COMPREHENSIVE, TECHNICAL, AND LEGAL RESPONSE TO COMMENTS

This section provides technical detail in response to comments or questions on the Centre County Kepone (Operable Unit #1) Site. These comments or questions were received at the August 28, 2000 public meeting, by mail or telephone during the public comment period and

may have been covered in a more general fashion in Part I of this Responsiveness Summary. The following specific comments are addressed:

A. Comments From Public Meeting Held On August 28, 2000
B. Comments Received By Mail
C. The Pennsylvania State University, Jon Chorover, Assistant Professor of Environmental Soil Chemistry, College of Agricultural Sciences

A. Comments From Public Meeting Held on August 28, 2000

These comments were collated from the Official Meeting Minutes recorded by Sargent's Court Reporting Service, Inc. of Johnstown, PA.

1. What percentage of the total contamination (volatile organics, kepone and mirex) will be removed via the proposed SVE/excavation plan?

   EPA Response: *The calculation of the percentage of total contamination removed can not be performed without a large margin of error and inaccuracies. EPA believes that the percentage of contamination to be removed by the Enhanced SVE/excavation will be greater than that would have been removed by just excavation alone. In fact, it is anticipated that the Enhanced SVE system will remove VOCs contained in the Site's bedrock which would not be removed by means of excavation alone. Lastly, clean-up criteria for all compounds will be met per the 1995 ROD.*

2. Since the SVE air discharge will require treatment prior to being released into the atmosphere, what is the specific process to be used for the air treatment? Can references be provided for sites where the proposed air treatment process has been implemented successfully?

   EPA Response: *Selection of a treatment process will be dependent upon the characteristics of the vapor stream. It is anticipated that a Regenerative Thermal Oxidizer (RTO) will be used to destroy the contaminants in the vapor stream and a scrubber will be used to treat the RTO exhaust. The RTO will operate at approximately 1600EF and will be equipped with instrumentation to monitor the combustion chamber temperature. Similar RTOs have been used at the Safety Kleen's solvent recovery facilities in Illinois and Texas. Additionally, a RTO unit is successfully being operated at the present groundwater treatment facility at the Centre County Kepone Site.*

3. If the technology exists to perform excavations safely under buildings/structures, why is this option not being considered to remove contaminated soil beneath the site's buildings/structures?

   EPA Response: *While soil excavation has been accomplished beneath buildings for*

foundation repairs and infrastructure construction, it has not, to our knowledge, ever been accomplished beneath an active chemical plant for environmental remediation reasons. Excavation beneath the active tank farm and chemical manufacturing plant would be hampered by underground utilities and would have major health and safety risks to construction workers, plant workers and the community. For instance, excavations performed beneath buildings require manual labor and therefore would expose workers to contaminated soil and vapor. Additionally, the immediate community has a greater risk of being exposed to vapors emitted from contaminated soil. The implementation of Enhanced SVE greatly reduces these risks as limited soil is disturbed and virtually all harmful vapors from the SVE system will be destroyed prior to discharge.

By the way of contrast, there are multiple examples of the successful use of SVE for remediation of VOC contamination beneath buildings, contributing to its status as EPA's presumptive remedy in these circumstances.

4. It appears that the site soils are poorly suited for the SVE technology, why is this option now being considered for the site?

EPA Response: *During the preparation of the Feasibility Study in 1993, hydraulic fracturing and multiphase extraction were still in their development stages and little was known regarding their effectiveness. Information became available indicating that, with the combination of hydraulic fracturing and multiphase extraction, SVE can be an effective means to remove VOCs from low permeability soils.*

As this information became available, and with the EPA acceptance of Enhanced SVE as a presumptive remedy (EPA document numbers 540/F-96/008 and 540-F-97-004), an 11 month full-scale Pilot Study was performed on Site. The design and results of these studies were reviewed by EPA's experts at the EPA Office of Research & Development as well as by PADEP. These reviews concurred that, with hydraulic fracturing enhancement and muliphase extraction, Enhanced SVE was highly effective in removing VOC contamination at the Site. EPA evaluated fracture enhancements in its 1997 publication "Analysis of Selected Enhancements for Soil Vapor Extraction" (EPA 542-R-97) and found it to be proven effective in soils of the type present at the Site.

5. Preferential flow paths may potentially be generated during SVE operation and therefore only contamination exposed along these paths will be effectively removed. What proof will the EPA provide indicating that preferential flow paths will not be generated?

EPA Response: *Monitoring wells/points will be placed strategically between extraction points. These monitoring wells will be used to measure the vacuum generated within the treatment area to collect vapor samples. The combination of the vacuum measurements and vapor samples will indicate whether the presence of preferential flow paths exist. If*

the monitoring points indicate a lack of contaminant removal in a particular area, modifications will be made to the system to capture these contaminants.

6. The process of hydraulic fracturing appears to be a dangerous operation, what safety precautions will be taken to guarantee the safety of workers and nearby residents.

EPA Response: *The process of hydraulic fracturing involves first the drilling of borehole into the ground to desired depth with standard well drilling equipment. Once the borehole has been drilled, a section of hole is isolated and pressurized water is used to cut a disk shaped notch to initiate the fracture. A slurry of water, sand, and a thick gel is then pumped at a high pressure into the borehole to propagate the fracture.*

Since the majority of the activity to create the hydraulic fracture occurs within the borehole beneath the ground, workers and nearby residents are not readily exposed to pressurized water. All necessary precautions are taken to assure that all aboveground pumps, piping and hoses are in excellent working condition. Lastly, during the 11 month Pilot Study, subsurface monitoring was performed during the hydraulic fracturing process to confirm that no impact to surrounding building foundations occurred.

7. What are the human health risks associated with leaving a portion of the kepone and mirex contamination in the site soils?

EPA Response: *Kepone and mirex in excess of the clean-up standards will still be excavated and removed from the Site per the 1995 ROD. The clean-up standards applicable to mirex and kepone are protective of human health. Only concentrations below the clean-up standards will remain after excavation and will be isolated from human contact. Additionally, the existing groundwater recovery system is designed to prevent any residual off-site migration from occurring. Therefore, health risks will be associated with kepone and mirex after excavation will be minimized.*

8. What is EPA's explanation of why Kepone contamination on the Centre County site is not considered to be a RCRA U-listed waste?

EPA Response: *EPA currently believes that elevated kepone concentrations found at the Site are a result of wastewater runoff and not from the direct result of a commercial chemical product spill. Soils contaminated by wastewater runoff are not classified as a RCRA U-listed waste. This clarification has no effect on the remedy being performed at the Site.*

The RBC of 160 ppb quoted in the original ROD was intended to be used as a guide to decisions on the disposal methods to be used for soil and sediment excavated from the Site. The RBC has no bearing on the type or extent of clean-up that is to be undertaken. Since the ROD was written in 1995, significant additional new and historic data has been

obtained by EPA regarding the Site. EPA is clarifying the ROD to require that disposal decisions be made based on all available information (including data that will be collected during implementation of the clean-up) and current legal requirements. This change ensures that the excavated soil will be properly classified and disposed based on all the information available, rather than using a simplified RBC approach. All classification and disposal decisions will be subject to review by EPA and the Commonwealth of Pennsylvania.

9. Will the current groundwater extraction system impact the thermal regime in Spring Creek and what precautions are being taken to verify that no adverse thermal effects is currently occurring?

EPA Response: *Prior to the start-up of the groundwater recovery/treatment system, the PRP prepared a detailed model to predict any thermal impact of the discharge on the thermal regime of Spring Creek. This model took into account the worst case assumptions. Experts from both PADEP and EPA reviewed the model and concurred that there would not be a negative thermal impact to Spring Creek as a result of the treatment system's discharge. However, since the treatment system has only been in operation for a short time (less than one year), EPA is still evaluating this model with respect to field measurements. As part of this evaluation, an on going thermal monitoring program is being performed by the PRP. This monitoring program includes continuous measurement of the temperature of Spring Creek immediately up and down stream of the discharge point. This data will be utilized to verify the model and measure any thermal effects.*

10. If the source of the contamination is being removed by the SVE/excavation, why is it necessary to eliminate the existing discharge requirements into Thornton Spring?

EPA Response: *EPA is correcting certain provisions of the 1995 ROD that were not in accordance with applicable law and regulation. The Proposed Amendment requires that the Thornton Spring discharge comply with Pennsylvania Water Quality Standards for aquatic life and so Thornton Spring and Spring Creek will be fully protected.*

B. Comments Received By Mail

These comments were received by mail during the comment period.

1. While the proposed soil vapor extraction process is quite effective at removing volatile organic chemicals, the process will leave the major site contaminants, kepone and mirex in the soil presenting a significant threat to the purity and safety of the groundwater that feeds the nearby Thornton Spring, a major aquatic resource to the region.

EPA Response: *Almost all the environmental and human health risks posed by the Site is associated with volatile organic compounds (VOCs) leaching to groundwater and not with the pesticides kepone and mirex. EPA has therefore focused on ways to achieve greater treatment of soil VOCs.*

Kepone and mirex in excess of the clean-up standards will still be excavated and removed from the Site per the 1995 ROD. The clean-up standards applicable to mirex and kepone are protective of human health as well as the environment and fully take into account the leaching potential of these compounds into groundwater. Only concentrations below the clean-up standards will remain after excavation. Additionally, the existing groundwater recovery system is designed to prevent any residual off-site migration from occurring.

A major source of the kepone and mirex was the on-site drainage ditch. This source was removed when approximately 1,500 tons of contaminated soil were excavated and removed from the Site. Therefore, with a major source remediated and the safeguard of the recovery system, the purity and safety of the groundwater that feeds the nearby Thornton Spring is being appropriately protected. In fact, the concentrations of kepone and mirex in the tissue of fish located downstream of the Thornton Spring outfall have been steadily decreasing and are now below the FDA advisory levels.

2. Since the SVE will not remove kepone and mirex soil contamination, what assurances/safeguards are in place to prevent the mirex and kepone from migrating off site as they have in the past?

EPA Response: *Kepone and mirex in excess of the clean-up standards will still be excavated and removed from the Site per the 1995 ROD. The clean-up standards applicable to mirex and kepone are protective of human health as well as the environment and fully take into account the leaching potential of these compounds into groundwater. Only concentrations below the clean-up standards will remain after excavation. Additionally, the existing groundwater recovery system is designed to prevent any residual off-site migration form occurring.*

A major source of the kepone and mirex was the on-site drainage ditch. This source was removed when approximately 1,500 tons of contaminated soil were excavated and removed from the Site.

3. Under the proposed remediation with the ROD Amendment, what potential exists for the kepone and mirex to migrate off site after the groundwater recovery/treatment system is turned off?

EPA Response: *The potential for kepone and mirex to migrate off-Site once the groundwater recovery/treatment system is turned off will be eliminated for the following reasons:*

- *Kepone and mirex in excess of the clean-up standards will be removed.*
- *A major source of kepone and mirex has been removed from the on-Site drainage ditch.*
- *The recovery/treatment system will not be turned off until definitive data exists assuring that concentrations of all contaminants are below applicable discharge requirements for Thornton Spring.*
- *Stormwater controls per the PRP's National Pollution Discharge Elimination System (NPDES) permit are and will be in place so that potential contaminants from plant operations will not migrate off site.*

4. Since the SVE does not remediate kepone and mirex, how does the EPA plan on remediating these compounds at the Site?

EPA Response: *The remedial remedy for mirex and kepone has not changed. Mirex and kepone will still be excavated/removed per the clean-up standards as indicated in 1995 ROD.*

5. The ROD Amendment proposes to clarify the Spring Creek thermal regime requirements. What steps are now being taken to enure that Spring Creek's thermal regime is not impacted by the pump and treat system currently operating?

EPA Response: *Prior to the start-up of the groundwater recovery/treatment system, the PRP prepared a detailed model to predict any thermal impact of the discharge on the thermal regime of Spring Creek. This model took into account the worse case assumptions. Experts from both PADEP and EPA reviewed the model and concurred that there would not be a negative thermal impact to Spring Creek as a result of the treatment system's discharge. However, since the treatment system has only been in operation for a short time (less than one year), EPA is still evaluating this model with respect to field measurements. As part of this evaluation, an on going thermal monitoring program is being performed by the PRP. This monitoring program includes continuous measurement of the temperature of Spring Creek immediately up and down stream of the discharge point. This data will be utilized to verify the model and measure any thermal effects.*

6. What is the expected time line to completely remediate the site of VOCs, mirex and kepone?

EPA Response: *Once the ROD Amendment is approved and the design completed, the remediatinn of mirex and kepone above clean-up levels will require approximately one construction season to complete. EPA anticipates that the Enhanced SVE system will be required to operate for three to five years to effectively remediate the VOCs from the Site soils.*

7. How will the efficiency of the soil vapor extraction process be monitored so that accurate efficiency rates can be calculated?

EPA Response: *Due to the difficulties of estimating of the amount of contamination that is currently available for removal by the SVE system, it is impracticable to accurately calculate the efficiency of the system. Therefore, the remedial goal is not set at obtaining a certain level of efficiency, but is set at meeting the targeted soil clean-up standards.*

As part of obtaining the soil clean-up standards, the removal efficiency of the Enhanced SVE system will be estimated to monitor and evaluate its performance. This will be done utilizing historic and pre-design soil sampling results in conjunction with vapor and groundwater sampling results from monitoring wells and the system's influent streams. Additionally, intermediate sampling intervals will be developed as part of the required design criteria to properly monitor the effectiveness of the remedial strategy. The Enhanced SVE system will also be periodically cycled to assure that a rebound in contaminate concentrations does not occur. Lastly, final soil sampling will be performed to verify that all clean-up standards (per the ROD) have been met prior to removing the system from service.

8. If the SVE remedy is unsuccessful, will the EPA require that Ruetgers Organics implement an alternative remediation plan to clean up the Site?

EPA Response: *Under the Superfund program, the EPA will perform a formal review of the remedy's performance and evaluate its overall effectiveness. If as a result of the review, it is determined that the remedy is inadequate to meet the applicable clean-up standards, EPA will require the PRP to develop and implement an alternative remedy. This remedy will still require the PRP to adhere to the requirements of the ROD.*

9. EPA has indicated that the air generated from the proposed SVE system will be treated by a pollution control devices such as a thermal oxidizer. How will the air discharged from the pollution control device be monitored to assure that compounds such as dioxins will not be released into the atmosphere?

EPA Response: *The Proposed ROD Amendment notes that the regenerative thermal oxidizer (RTO), installed as part of the groundwater remedy, will treat the VOCs that are extracted (p.2). This unit is required to fully satisfy the requirements of both EPA and PADEP air quality regulations so as to be protective of human health and the environment.*

Since the design of the proposed Enhanced SVE system is ongoing, exact details are not available regarding the devices to be used to monitor the proposed RTO.

However, it will be required that the any RTO unit will be equipped with instrumentation to accurately monitor and record the RTO combustion chamber temperature, scrubbing solution pH, and scrubbing solution flow rate on a continuous basis whenever the oxidizer is in use. When these parameters deviate from a set operating range (set forth by PADEP), the entire treatment system automatically shuts down and an alarm activated to notify on-site personnel.

Lastly, the formation of dioxins is not expected to be an issue for this treatment process. The formation of dioxins generally occurs when dry particulate matter exist at temperatures between 400EF and 750EF. At higher temperatures and in the absence of particulates, dioxin formation is not expected. Since this system introduces virtually no particulate matter to the RTO and the system will be operating at 1600EF, the formation of dioxins is unlikely.

10. Since more of the kepone and mirex will be left in the soil as a result of the proposed ROD Amendment, does the existing groundwater recovery/treatment system have enough capacity to handle flow rates resulting from a 100 year storm event so that the remaining kepone and mirex does not escape the site?

EPA Response: *Kepone and mirex in excess of the clean-up standards will still be excavated and removed from the Site per the 1995 ROD. The clean-up standards applicable to mirex and kepone are protective of human health as well as the environment and take into account the leaching potential of these compounds into groundwater. Only concentrations below the clean-up standards will remain after excavation thus eliminating the leaching potential of mirex and kepone into groundwater.*

The groundwater recovery/treatment system is designed to create storage capacity in the aquifer during times when precipitation is low. This storage is intended to be used during times of heavy precipitation events such as a 100 year storm so that the system does not become overwhelmed. As the aquifer receives additional water resulting from a storm event, the system can still maintain hydraulic control of the groundwater flow and prevent offsite migration of contaminants.

C. Comments of Pennsylvania State University, College of Agricultural Sciences - Jon Chorover, Assistant Professor of Environmental Soil Chemistry

1. The soils at the site are of high clay content and low permeability. Therefore, gaseous diffusion through these soils to where they can enter into the hydraulic fractured sand-infiltrated "conduits" will be mass transfer limited.

EPA Response: *Hydraulic fracturing actually shortens the path length required to achieve diffusion into the sand filled fractures. Coupled with high vacuum rates*

between 10 to 15 in-Mercury, the Enhanced SVE system is very effective in overcoming any potential mass transfer limitations associated with low permeability soils. In fact, the results of the 11 month Pilot Study confirm that Enhanced SVE is highly effective in removing VOC contamination at the Site.

2. Given that the soil is composed of solid porous media and void volume, hydraulic pressurized infiltration of the soil with sand will decrease the void volume of the bulk soil. That is, although sand-filled fractures will be generated, the contaminated soils adjacent to those fractures will be compacted by the introduction of new solids. This will further diminish the (already low) permeability of the soils for vapor transfer. The net result will be vapor transport along the sand-filled preferential flow paths, but migration of VOCs from the soil matrix into these flow paths will remain problematic.

   EPA Response: *Theoretically in a closed system where void and soil volumes are fixed/constant, a reduction of the void volume in the soil would occur as a result of the hydraulic fracturing. The volume of the soils and voids at the Site are not fixed/constant. In fact, the process causes an inch or so of uplift on the ground surface above the injection zone reducing the amount of compaction around the newly formed fractures. Furthermore, based upon the results of the on Site Pilot Study it is not believed that hydraulic fracturing diminishes the vapor transfer of VOCs from the soil surrounding the fractures.*

3. The efficiency of VOC mass removal with the SVE method is unknown. The EPA presented a comparison of mass removal using the two methods (SVE vs. soil excavation) that was misleading because it suggested higher mass removal with SVE. This assessment was clearly based on conservative estimates of soil excavation proximity to buildings and storage tanks. These estimates were clearly challenged by mining engineers in the audience, who indicated that excavations could be made (and have been previously made) very close to both buildings and tanks. Given that the site specific efficiency of SVE is unknown and that non-volatile contaminants would not be removed by SVE, the assertion of greater mass removal is unjustified.

   EPA Response: *The remedial goal for this Site is not to obtain a certain level of mass removal efficiency, but is set at meeting the targeted soil clean-up standards that are protective of human health and the environment. As part of the evaluation of the Enhance SVE remedy, an 11 month Pilot Study was performed at the Site to estimate the Site specific efficiency of the Enhanced SVE system. In fact, the data collected during the Study was used to estimate the amount of VOCs that can be removed from soil and bedrock by this remedy. This data was reviewed by the EPA's experts at the EPA Office of Research & Development as well as by PADEP. These review concurred that, with hydraulic fracturing enhancement, SVE was highly effective in removing VOC contamination at the Site. Lastly, the Pilot Study proved*

to be effective in the removal of VOCs contained in bedrock. These VOCs would not be removed under the excavation remedy.

Even though soil excavation has been accomplished beneath conventional buildings and structures for foundation repairs and infrastructure construction, it has not, to our knowledge, ever been accomplished beneath an active chemical plant for environmental remediation purposes. Excavation beneath the active tank farm and chemical manufacturing plant would be hampered by underground utilities and would have major health and safety risks to construction workers, plant workers and the community. The risks associated with excavating beneath buildings and tanks will be greater than the benefits achieved by removal of these contaminants.

For the above reasons and since the pesticides mirex and kepone will still be excavated and removed to the clean-up standards as indicated in the 1995 ROD, EPA has justification to assert that a greater mass of contaminants will be removed with the Enhanced SVE remedy compared to the excavation remedy.